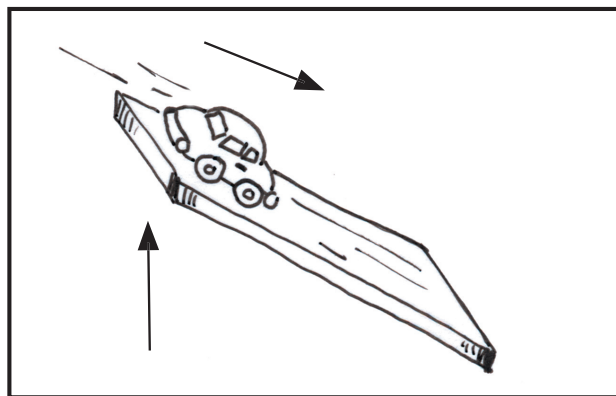


1. Where is the stored energy in this toy car?



- A. In the car's axle
- B. In the car's design
- C. In the car's position
- D. In the car's wheels

2. What force is moving the car?

- A. Gravity
- B. Inertia
- C. Moving air
- D. Rubber band energy

3. Two students are recording the time it takes to run across the playground. Which tool will they use?

- A. Gram scale
- B. Hand lens
- C. Meter stick
- D. Stopwatch

4. Shane is testing the speed of his vehicle. He tested his vehicle on 2 different tracks. In which trial did the vehicle go the fastest?

- A. Trial 1 (Track 1) - 100 cm in 31 seconds
- B. Trial 2 (Track 1) - 100 cm in 27 seconds
- C. Trial 3 (Track 2) - 200 cm in 58 seconds
- D. Trial 4 (Track 2) - 200 cm in 52 seconds

5. Alex built a gravity powered vehicle. What is the best way for Alex to find the distance his vehicle will travel?

- A. Roll the car across the floor, time it with a stopwatch
- B. Roll the car across the floor, measure with a meter stick
- C. Roll the car down a ramp, time it with a stopwatch
- D. Roll the car down a ramp, measure with a meter stick

6. Which of these energy forces move a sail boat across a lake?

- A. Atomic energy
- B. Electrical energy
- C. Solar energy
- D. Wind energy

# of turns of the rubber band	Distance traveled			Average distance
	Trial 1	Trial 2	Trial 3	
2	40 cm	65 cm	45 cm	A
4	70 cm	59 cm	90 cm	73 cm
8	101 cm	110 cm	B	103 cm

Use the data table above to answer questions 7 and 8.

7. Look at space A. What is the average distance the vehicle traveled with 2 turns of the rubber band?

- A. 45 cm
- B. 50 cm
- C. 98 cm
- D. 125 cm

8. Look at space B. Which of these is most likely the distance recorded in box B?

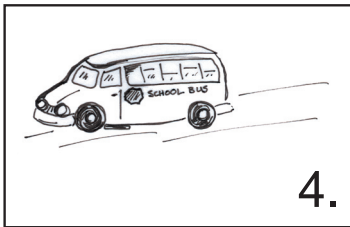
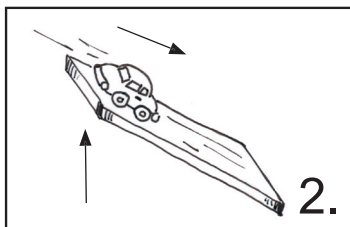
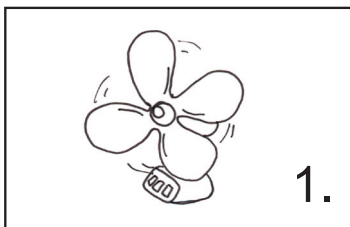
- A. 45 cm
- B. 50 cm
- C. 98 cm
- D. 125 cm

9. Arlie built a rubber band driven car. What is the function of the rubber band?

- A. Connect the two axles
- B. Increase friction
- C. Power the car
- D. Strengthen the frame

10. Which one depends on gravity to move?

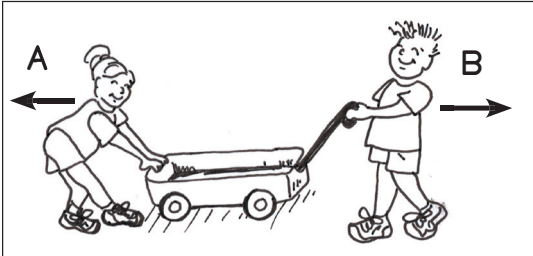
- A. 1
- B. 2
- C. 3
- D. 4



11. Misha built a rubber band powered vehicle. How does the rubber band move the car?

- A. Energy is stored in the rubber band
- B. Energy is stored in the wheels
- C. Energy is stored in the axle
- D. Energy is stored in the design

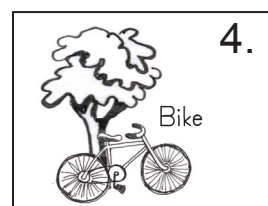
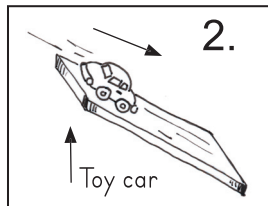
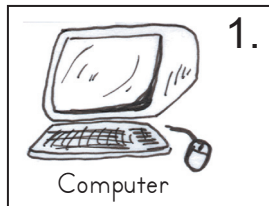
12. Both students are pulling on the wagon. The students pull with the same amount of force. Which describes the movement of the wagon?



- A. Wagon moves backward
- B. Wagon moves forward
- C. Wagon does not move
- D. More information is needed

13. Which of these show an unbalanced force?

- A. 1, 2
- B. 2, 3
- C. 2, 4
- D. 3, 4



14. Which of these is the best example of the effect of friction?

- A. A fast spinning toy top
- B. A vehicle carrying wood blocks
- C. Students lifting heavy rocks
- D. Brakes rubbing against a bicycle tire

15. Chelsea and Palo's model vehicle costs too much to build. They cut the cost of their vehicle by \$4.00 by taking off 3 long rods. How can they be sure the vehicle still works?

- A. Look closely at the data
- B. Record the changes in a notebook
- C. Set up a test for the vehicle
- D. Subtract \$4.00 from the total cost

16. Road workers just paved a lightly traveled street by Andy's house. What effect will the smooth surface have on Andy's skateboard?

- A. Less friction
- B. Less momentum
- C. More inertia
- D. More surface area

17. There is a small hill at one end of the street. How does a hill affect Andy's ride?

- A. The skateboard has less momentum down the hill
- B. The skateboard rolls faster with the force of gravity
- C. Rolling downhill the forces are balanced
- D. Moving up the hill the forces are balanced

18. Where does the skateboard store the most energy?

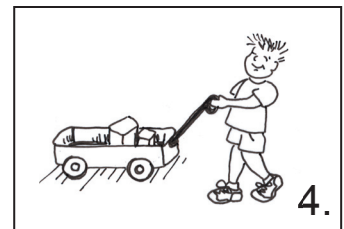
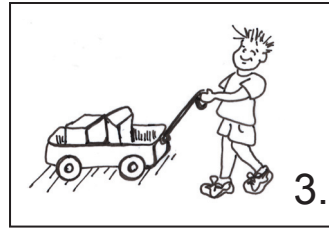
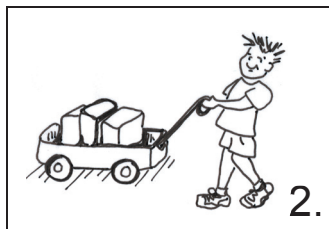
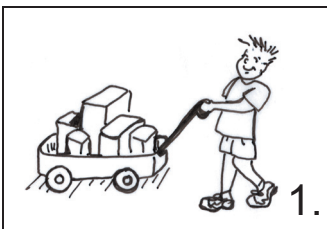
- A. At the top of the hill
- B. At the bottom of the hill
- C. Near the bottom of the hill
- D. Near the middle of the hill

19. Andy's little sister just likes to sit on the skateboard. She likes to sit at the top of the hill. Why will the skateboard stay at the top of the hill unless another force acts on it?

- A. Inertia
- B. Kinetic energy
- C. Momentum
- D. Force

20. Which wagon takes the most force to move?

- A. 1
- B. 2
- C. 3
- D. 4



21. Marshall and Katie are building a vehicle to meet a design challenge. Think like a scientist. What is the first step?

- A. Build
 - B. Evaluate
 - C. Plan
 - D. Test
-

22. Emily and Bob built a model vehicle that carries and dumps wood blocks. How will they make sure the vehicle works?

- A. Draw the vehicle
 - B. Graph results
 - C. Measure the distance
 - D. Test the vehicle
-

23. Amy's grandma is coming to live with her. Her grandma has trouble walking up stairs. What simple machine is the easiest way to help grandma walk into Amy's house?

- A. A pulley
 - B. A ramp
 - C. A screw
 - D. A hinge
-

24. Park rangers are designing a new trail. They are making the trail handicap accessible. What's one way to reduce friction on the trail and make it easier for people in wheelchairs to enjoy the woods?

- A. Build wide steps with railings
 - B. Cover the trail in soft sand
 - C. Make the trail smooth and paved
 - D. Put rocks around the mud puddle
-

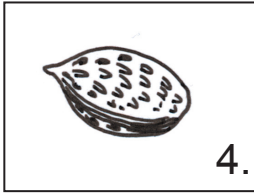
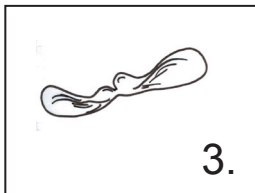
25. Andrew turns a model car upside down and spins one wheel. He does not touch the wheel after it starts spinning. What causes the wheel to slow down and stop moving?

- A. Friction
 - B. Inertia
 - C. Momentum
 - D. Motion
-

26. Jenny is designing a model parade float to travel 200 cm. Colored paper is taped to the back and drags behind the float. The float looks great but stops short of the distance needed. What might she change to get the float to travel a longer distance?

- A. Add more decorations to the vehicle
- B. Attach the paper so that it is not dragging
- C. Build a longer, heavier vehicle
- D. Build the vehicle with more pieces

27. Which of these seeds are designed to travel using wind energy?



- A. 1, 2
- B. 2, 3
- C. 3, 1
- D. 4, 2